DISCLAIMER: These Standard Operating Procedures (SOP's) are for the exclusive use of Navy Public Works Center (PWC) Norfolk. They are promulgated as guidance for their NAVFAC Commands. If intended to be used by other activities, they must be tailored to each activity's particular requirements and must be reviewed/approved by the activity's safety professionals prior to use.

# NAVY PUBLIC WORKS CENTER
# NORFOLK, VIRGINIA
# UTILITIES

**STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS**

**TITLE**

## PREVENTATIVE MAINTENANCE
## PIER LOW VOLTAGE SWITCHGEAR

**PROCEDURE NUMBER**

## 622.4 ELE 14

**SIGNED:**_____

**(DATE)**

**APPROVED:**_____

**(DATE)**

**SAFETY PROFESSIONAL:**_____

**(DATE)**

**MANAGEMENT OFFICIAL:**_____

**(DATE)**

**REVISION** **A**

PREVENTATIVE MAINTENANCE
PIER LOW VOLTAGE SWITCHGEAR

# DISTRIBUTION

| CODE | REV/DATE | REV/DATE | REV/DATE | REV/DATE | REV/DATE | REV/DATE | REV/DATE |
|---|---|---|---|---|---|---|---|
| **620** | | | | | | | |
| **622** | | | | | | | |
| **610** | | | | | | | |
| **610.E1** | | | | | | | |
| **601A** | | | | | | | |
| **30A** | | | | | | | |
| **09A** | | | | | | | |
| **216** | | | | | | | |
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PREVENTATIVE MAINTENANCE
PIER LOW VOLTAGE SWITCHGEAR

# REVISIONS

| REV | DESCRIPTION | SIGNATURE | DATE |
|---|---|---|---|
| A | Initial Issue. | David Midgett | 9/5/96 |
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PREVENTATIVE MAINTENANCE
PIER LOW VOLTAGE SWITCHGEAR

**Purpose:**

Procedure to perform preventative maintenance on the low voltage(480 volt) switchgear located in above and below pier vaults. The pier vault will be de-energized and properly prepared for entry per reference SOPs prior to PM work. The vault will be re-energized per reference SOPs after PM is complete.

**Potential Energy Sources:**

1. 120/240 volt temporary control power to switchgear via vault alternate power or a generator.
2. 480Y277 volt transformer secondary bushings.
3. 2500 or 1000 volt DC insulation resistance test voltages.

**Tools and PPE:**

Tools: Small hand tools, cleaning equipment, 2500 volt DC insulation resistance test set, 1000 volt DC insulation resistance test set, voltage tester, and circuit breaker lifting devices. PPE: Safety glasses, work gloves, and safety shoes, and back brace(if required to wear one by back injury and prevention program).

**References:**

1. PWC Occupational Safety and Health Program Manual, PWCNORVAINST 5100.33E
2. Occupational Safety and Health Standards for General Industry (29 CFR PART 1910): Subpart I, Personnel Protective Equipment; Subpart R, Electrical Power Generation / Transmission / Distribution; Subpart S, Electrical
3. SOP WC 622 HVE 013, Hazardous Energy Control(Lockout/Tagout)
4. SOP 600HVE2, Entering Above Ground Vault On Pier
5. SOP 600HVE4, Entering Below Pier Electrical Vaults
6. SOP 600HVE8, Electrical Manhole Entry
7. SOP 600HVE3, Exiting Above Ground Pier Electrical Vaults
8. SOP 600HVE5, Re-Energizing Below Pier Electrical Vaults.
9. SOP 622,4 ELE 12, Shore Power Low Voltage Circuit Breaker Maintenance - Annual Maintenance.
10. SOP 622.4 HVE 1, Tapping 120/220 Volt Temporary Control Power in Below Pier Vaults.

PREVENTATIVE MAINTENANCE
PIER LOW VOLTAGE SWITCHGEAR

**Procedures:**

Note: correct all deficiencies found.

1. Remove all feeder breakers from switchgear. Take the feeder breakers to the circuit breaker PM/Repair shop for the required preventative maintenance work.

2. Remove all access covers of switchgear.

3. Clean the interior and exterior of the switchgear enclosure(including access panels). Vacuum the switchgear floor.

4. Prepare the surface and paint all rusted areas of switchgear enclosure's exterior and interior surfaces(including access panels).

5. Inspect all secondary feeder cable connections to the switchgear. Check for overheating and tight connections.

6. Inspect the connections from the transformer to the switchgear bus(s). Check for overheating and tight connections.

7. Clean all insulators. Inspect the insulators for cracking, chipping, and tracking. Replace or repair damaged insulators.

8. Inspect the switchgear bus(s) for overheating and/or damage. Check all bus bolts for tightness. Replace all rusty, corroded, bolts.

9. Inspect all control molded case breakers and fuses. Do not touch energized electrical parts while performing inspection.

10. Check enclosure heaters. Replace in not working.

11. For each breaker cube:
    a) Ensure that the racking device is working properly. Lubricate the mechanism.
    b) Inspect sliding contacts, control wiring, control fuses, and terminal blocks.
    c) Inspect line and load bus for overheating and/or damage. Check all bus bolts for tightness. Replace all rusty, corroded, bolts.
    d) Inspect cubical insulators for signs of tracking and overheating.

e) Check heater, replace if not working.

12. If main breaker(s) exist, follow SOP 622.4 ELE 12, Shore Power Low Voltage Circuit Breaker Maintenance - Annual Maintenance, and PM the switchgear's main breaker(s).

13. If main fuse truck(s) exist, inspect the fuses and fuse trucks.
    a) Clean insulating areas of the fuses.
    b) Clean contact areas of fuse and fuse holders.

14. Perform a 2500 volt DC insulation resistance tests on the following buses:
    a) Transformer connection to main breaker(s). Note, the transformer will have to be disconnected from this bus prior to this test.
    b) Bus 1, main breaker #1's bus.
    c) Bus 2, main breaker #2's bus.

Note, only one breaker bus may exist. Perform phase to phase and each phase to ground tests.

15. Perform a 1000 volt DC insulation resistance test on each feeder cable connected to the switchgear. Perform phase to phase and each phase to ground tests.

16. Once all testing is complete, including a transformer secondary winding insulation resistance test per SOP WC 624 HVE 075, PM Unit Substation Transformer, reconnect transformer to switchgear.

17. Re-install all switchgear access covers.

18. Once the feeder breaker PMs are complete, pick up the breakers at the circuit PM/Repair shop and take to pier and place back into the switchgear. Ensure all feeder breakers and main breakers are racked in to the connected position.

END